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In the Supreme Court of the United States

OCTOBER TERM, 1979

SIDNEY A. DIAMOND, COMMISSIONER OF PATENTS AND TRADEMARKS, PETITIONER

v.

JOHN J. BRADLEY AND BENJAMIN S. FRANKLIN

ON WRIT OF CERTIORARI TO THE UNITED STATES COURT OF CUSTOMS AND PATENT APPEALS

BRIEF FOR THE PETITIONER

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OPINIONS BELOW

The opinion of the Court of Customs and Patent Appeals (J.A. 10-20) is reported at 600 F.2d 807. The opinion of the Patent and Trademark Office Board of Appeals (J.A. 193-203) and the opinions of the patent examiner (J.A. 121-125, 150-152, 163-164) are not reported.

JURISDICTION

The judgment of the Court of Customs and Patent Appeals was entered on July 5, 1979 (J.A. 20a). On

October 2, 1979, the Chief Justice extended the time to file a petition for a writ of certiorari to and including December 2, 1979, and the petition was filed on Monday, December 3, 1979. Certiorari was granted on March 17, 1980. The jurisdiction of this Court is invoked under 28 U.S.C. 1256. *Gottschalk* v. *Benson*, 409 U.S. 63 (1972); *Dann* v. *Johnston*, 425 U.S. 219 (1976); *Parker* v. *Flook*, 437 U.S. 584 (1978).

QUESTION PRESENTED

Whether a computer program that regulates the internal operation of a computer is patentable subject matter under 35 U.S.C. 101.

STATUTE INVOLVED

35 U.S.C. 101 provides:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

STATEMENT

On April 21, 1975, John J. Bradley and Benjamin S. Franklin applied for a patent (J.A. 24) on an invention that directs the transfer of data within a computer.[1].

The computer's hardware[2] includes a main memory,

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[1] The invention is assigned to Honeywell Information Systems, Inc. ("Honeywell") (Br. In Opp. 2).

[2] The physical components of the computer are called "hardware." *Honeywell, Inc.* v. *Lithonia Lighting, Inc.*, 317 F.Supp. 406, 408 (N.D. Ga. 1970); Ross, *The Patentability of Computer "Firmware,"* 59 J. Pat. Off. Soc'y 731, 736 (1977).

which has a system base[3] with which the user of the computer can communicate.[4] In high performance computers, where speed of operation is important, certain information that is part of the system base may be stored in storage components of the computer called "scratchpad registers" (J.A. 11 & n.1). Because these registers are not, however, normally accessible to the user by means of computer programs (J.A. 11), changing the data they contain has been a problem.[5]

Respondents' claimed invention facilitates changing the data in the registers. In addition to certain hardware elements, it employs "firmware" (J.A.11). Firmware consists of a sequence of basic instructions stored as a microprogram in the computer's control

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[3] The system base stores information used to control the computer in carrying out programmed operations.

[4] A user wanting a general purpose digital computer to perform a certain assigned task communicates with the computer by translating the task into coded instructions that can be read, understood and executed by the computer system. These instructions, called a "program," are written in special programming languages, such as COBOL or FORTRAN. See C. Sippl & C. Sippl, *Computer Dictionary and Handbook* 80, 191 (2d ed. 1972); *In re Ghiron*, 442 F.2d 985, 986 (C.C.P.A. 1971); *In re Waldbaum*, 457 F.2d 997, 998 (C.C.P.A. 1972). Computer programs as well as the information (data) fed into the computer are commonly called "software." *Honeywell, Inc.* v. *Lithonia Lighting, Inc.*, *supra*, 317 F. Supp. at 408; Ross, *supra*, 59 J. Pat. Off. Soc'y at 736. Computer users either write their own programs or obtain them from software vendors. In 1978, user expenditures for software products amounted to $981 million. Cunningham & Smith, "Computer Services: A Menu of Options," *Datamation* 89, 91 (May 25, 1979).

[5] To change the data in the scratchpad registers the user has had to reload the entire system base, a time consuming task, or use software limited to that particular computer model, an option unacceptable to many computer users (J.A. 11).

memory.[6] When activated by software, the instructions cause a particular sequence of computer operations to take place.[7] An instruction in the firmware developed by respondents permits the user to communicate with the scratchpad registers and to switch data back and forth from the registers to the system

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[6] A microprogram has been defined as a " 'sequence of elementary steps which permits the computer hardware to carry out a program instruction.' " Ross, *supra*, 59 J. Pat. Off. Soc'y at 754, quoting from P. Jordain & M. Breslau, *Condensed Computer Encyclopedia* 318 (1969). Thus, the microprogrammer, like the programmer, uses special programming language to prepare instructions for the computer to carry out in sequence. Ross, *supra*, 59 J. Pat. Off. Soc'y at 765. The microprogram is usually stored in a "control memory," in the instant specification called a "control store" or "control unit" (J.A. 60), physically separate from other computer memories. Ross, *supra*, 59 J. Pat. Off. Soc'y at 758. Early control memories were of the "read only" variety ("ROM") which meant that the microprogram was physically fixed in the control memory by the manufacturer. To change the microprogram the manufacturer had to install a new ROM with the new microprogram. Technical advances made it possible for the user himself to microprogram the control memory (programmable read only memory, "PROM"). Although the original PROMs could be programmed only once, many large computers now have PROMs that permit the user to reprogram the control memory any number of times electrically, without hardware alteration. *Id.* at 760–761; R. Kline, *Digital Computer Design* 333–335 (1977); IEEE Computer Society Technical Committee on Microprogramming, *Microprogramming Definitions*, 7 SIG Micro Newsletter 7, 12 (Dec. 1976).

[7] In respondents' specification the firmware is stored in the "control store unit CSU 1301" (J.A. 60). Typically this unit has a "programmable read-only memory (PROM) mixed with read/write random access store (RAM)" (*id.* at 61) (see note 6, *supra*). Thus while microprograms normally "are loaded from an external source during system initialization and become a permanent control function of the machine," the unit "has the ability to be reloaded and initialized in a manner that provides for a variety of * * * operational modes" (J.A. 60).

base in the main memory (*id.* at 11–13).[8] While respondents' specification describes an arrangement of computer machinery (*id.* at 99–119), the microprogram's use is not limited just to the digital computer so described. "[A]ny control store [control memory] having a ROM" may be "microprogrammed with the flow charts of Figures 15b and 15c" of respondents' specification (*id.* at 141), and respondents make particular reference to two other patented "computer processors" that include "microprogrammed control units with which the instant invention may be practiced" (*id.* at 134; but cf. Br. in. Opp.7 n.13).[9]

The patent examiner rejected the invention as drawn to nonstatutory subject matter under 35 U.S.C. 101 (J.A. 151–152, 163–164).[10] He noted that the hardware arrangement to which the claims re-

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[8] When the computer user activates what respondents call a "switch system base instruction," this initiates the execution of a microprogram that transfers the data (J.A. 27–28). In respondents' specification, the switch system base instruction is disclosed by the diagram in Figure 15a (*id.* at 78, 120) and the microprogram steps are disclosed in the flow charts of Figures 15b and 15c (*id.* at 79, 120).

[9] As respondents explained in the amendment to their application (J.A. 143), "* * * the present invention is directed to hardware structures controlled by a microprogrammed control system which provides for the generation of [specified] signals * * *."

[10] The examiner's initial rejection (J.A. 121–125) was also based on inadequate disclosure, failure to "particularly point out and distinctly claim the subject matter sought to be patented" (*id.* at 123), and prior art (the Hauck patent), *id.* at 124. Respondents then amended their application, modifying the specification (*id.* at 126–129), offering citations to show where the principal components of their claimed invention had been previously used or identified (*id.* at 129–134), and distinguishing

ferred—"a main memory, central processing unit, and scratchpad registers"—were "well known components" that were "admittedly old in the art * * *" (*id.* at 151-152).[11] He found that the only novel aspect of the invention resided in an algorithm[12] designed to direct the computer to solve the particular problem indicated (*ibid.*).[13] He concluded that this "program implemented algorithm" was not patentable under *Gottschalk* v. *Benson*, 409 U.S. 63 (1972) (*ibid.*).

The Patent and Trademark Office Board of Appeals agreed with the examiner (J.A. 202). It found that "save for the microprogramming" respondents' arrangement of hardware was old in the art (*id.* at 200). It ruled that the fact that respondents' claims were in "apparatus," rather than "methods," format did not

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the Hauck patent (*id.* at 147-149). The examiner thereupon reaffirmed his rejection of the application on the ground that it was directed to nonstatutory subject matter (*id.* at 150-152).

[11] That admission was contained in the amendment to the application (note 10, *supra*; J.A. 129-134).

[12] In the context of computer technology, an algorithm is a term of art:

> 1. A fixed step-by-step procedure for accomplishing a given result; usually a simplified procedure for solving a complex problem, also a full statement of a finite number of steps. 2. A defined process or set of rules that leads [sic] and assures development of a desired output from a given input. A sequence of formulas and/or algebraic/logical steps to calculate or determine a given task; processing rules.

C. Sippl & C. Sippl, *supra*, at 23.

[13] The examiner further noted in his answer before the Patent and Trademark Office Board of Appeals that microprogrammed control units like respondents' were also old in the art (J.A. 182). Thus, he concluded that the invention "resides in an instruction in firmware which changes, upon execution, information in the system base" (*ibid.*).

make them any less "related to an algorithm" than was the claim in *Benson* (*id.* at 201).[14] Added the Board, "[a] claim for an improved method of calculation, even when tied to a specific end use, is unpatentable" under *Parker* v. *Flook*, 437 U.S. 584 (1978) (*id.* at 202). The Board concluded that respondents' claimed invention consists of apparatus that is old in the art coupled with "programming which is nonstatutory" under *Benson* and *Flook* (*ibid.*).

The Court of Customs and Patent Appeals reversed. It observed that respondents were claiming "a machine or apparatus" composed of a "combination of *hardware elements*" which fell "literally within the boundaries of §101" (J.A. 18). The court recognized that this "combination" also involves "a portion of the computer's control store microprogrammed in a particular manner" (*id.* at 19). It left standing the Board's determination that the apparatus was old in the art and that only the microprogram was new (*id.* at 18), but it rejected the Board's "distillation of [the] claim down to the information contained in the firmware * * *" (*id.* at 19). The proper analysis, the court asserted, involves determining "whether the claim recites a mathematical algorithm, and, if so, whether it preempts the use of the algorithm" (*ibid.*). Applying this test, it stated that there was no mathematical algorithm here (*id.* at 20). Although certain calculations were made, they did not "transform the invention as a whole into a method of calculation" because, after the invention's task was completed, there was not present

[14]Thus, the claims "recite[d] apparatus as a matter of form only" (J.A. 202).

a "solution of an equation, such as the new alarm limit in *Flook*, or the equivalent pure binary number, as in *Benson*. * * *" (*ibid.*). Indeed, the court saw "no difference" between respondents' invention "and a strictly mechanical adding machine * * *" (*id.* at 18–19).

SUMMARY OF ARGUMENT

The Board of Patent Appeals applied the principles of *Parker* v. *Flook*, 437 U.S. 584 (1978) to the facts of this case and correctly concluded that respondents' claims did not recite statutory subject matter because, aside from an unpatentable computer-implemented algorithm, everything else in the claims was conventional.

Computer programs, which are simply the expression in language intelligible to the computer of the fundamental ideas of the computer user, are outside of the scope of Section 101, whether viewed as translations or as abstract intellectual concepts. Moreover, since these programs simply describe particular examples of the inherent operations of conventional computers, they are not patentable as novel applications of known machines. Although the algorithms this Court considered in *Flook* and in *Gottschalk* v. *Benson*, 409 U.S. 63 (1972), were designed to solve mathematical problems, those cases do not turn on that fact; all computer-implemented algorithms are equally unpatentable. Nor is it significant that the novel computer program at issue here is firmware (a microprogram stored in a control unit), rather than software (a program stored in a computer's main memory unit). Firmware does not convert the conventional computer,

designed to accept firmware of this type, into a new, patentable machine.

As this Court noted in *Benson* and *Flook*, the decision whether, and by what method and to what extent, protection should be afforded to computer programs is for Congress, particularly since the matter is currently under consideration in that body.

ARGUMENT

I. RESPONDENTS' CLAIMS LACK PATENTABLE SUBJECT MATTER

This Court in *Parker* v. *Flook*, 437 U.S. 584 (1978), prescribed a two-step test for determining whether a claimed invention is statutory subject matter under Section 101. First, the claim must be searched to determine whether it recites a scientific principle, idea, concept, formula, or phenomenon of nature (J.A. 591–594). That "basic tool [ ] of scientific and technological work" (*Gottschalk* v. *Benson*, *supra*, 409 U.S. at 67) should be "assumed to be within the prior art" (437 U.S. at 594). Second, what remains must be analyzed to determine whether it is novel (see *O'Reilly* v. *Morse*, 56 U.S. (15 How.) 61, 115 (1853)). If what is left is old, the claim does not recite statutory subject matter. *Parker* v. *Flook*, *supra*, 437 U.S. at 594–595. Applying this test, the Board found that the claims here recited an unpatentable algorithm for implementation by a digital computer, that everything else in the claims was conventional, and therefore that the claims were nonstatutory (J.A. 202).

This was a straightforward, and correct, application of the legal principles of *Parker* v. *Flook* to the facts of this case. The hardware comprising respondents' in-

vention is well known. Indeed, in their amended application respondents referred to prior art[15] to describe the principal hardware components they utilized (J.A. 129–134), including, among others, the main memory (J.A. 132), scratch pad memory (J.A. 132–133), and control store unit (J.A. 133–134). Nor can there any longer be a substantial claim that respondents' arrangement of these components is novel. The examiner and Board of Appeals rejected that claim (J.A. 151, 200), and the court below did not disturb that rejection (J.A. 18). To be sure, respondents claim here (Br. in Opp. 14–15, 19), as they did unsuccessfully in the court below (J.A. 18), that they have created a unique hardware arrangement. They are unable, however, to show that the Patent Office's findings are clearly erroneous.[16] Indeed, respondents admitted in their ap-

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[15] *E.g.*, prior patent applications, books, and existing machines.

[16] They did not attempt to do so in their opposition to the petition for certiorari, preferring instead simply to assert that "on the record before this Court, the Respondents' invention is acknowledged to be a new machine as claimed" (Br. in Opp. 3 n.7). This is clearly incorrect. Although in his final denial of the application the examiner did not rely on the Hauck patent as prior art (see note 10, *supra*), he did rely on the conclusion that the "environment" of the claim was "a multi programming computer system comprised of * * * well known components" and that "any life which the claim may have in view of that which is admittedly old in the art, resides in the * * * 'switch-system base instruction" (J.A. 151–152). The Board agreed (*id.* at 198–200, 202). Respondents recognized this in their notice of appeal to the court below (*id.* at 205). It was precisely because respondents' claims disclosed no novel arrangement of hardware that their application was rejected by the examiner and the Board. As noted, *supra*, page 7, the court below left the premise of this rejection undisturbed, but found the combination of

plication that other inventors, not they, had earlier obtained a patent whose specification disclosed a hardware arrangement identical to respondents'.[17] Moreover, respondents do not now dispute acknowledging in their application that Claude Carre and others had previously invented a computer machine with the same hardware arrangement now claimed in respondents' diagrams (compare Br. in Opp. 12 n.22 with Pet. 8–9 n.12). Thus, whatever inventiveness inheres in respondents' claimed digital computer must reside either in the algorithm itself or in the algorithm coded in firmware that is itself old in both form and arrangement. In neither case have respondents claimed statutory subject matter.

A. COMPUTER PROGRAMS ARE NOT PATENTABLE.

This Court suggested in *Benson* and more emphati-

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old hardware, conventionally used, with the microprogram to be patentable (J.A. 18–20).

[17]To overcome an initial rejection on the ground that their description of the invention was not sufficiently specific under 35 U.S.C. 112, respondents, in an amendment, stressed that their arrangement of hardware components had already been patented (J.A. 136). Thus, they observed that in their specification "Figures 1–14h are identical" to those in U.S. Patent No. 3,891,974 assigned to Honeywell, and that "the specification describing these figures is substantially the same" (*ibid.*). (The application for U.S. Patent No. 3,891,974 was filed by Coulter and Migdalek on December 17, 1973, more than a year before Respondents' application). In fact, Figures 1–14i, not "h", are the same in the issued patent and in Respondents' specification. The only difference is in the addition of Figures 15a–c in Respondents' specification to depict the microprogram (J.A. 120; see, also, Pet. 8 n.12 discussing the prior Carre patent application and Pet. App. 52a–53a). A copy of the Coulter patent and of the Carre patent application have been lodged with the Clerk of this Court.

cally indicated in *Flook* that traditional computer programs—*i.e.*, software—are unpatentable. *Benson*, *supra*, 409 U.S. at 72-73; *Flook*, *supra*, 437 U.S at 595. Respondents' assignee Honeywell agrees here, as it did in *Benson*, that computer programs are not and should not be patentable (Br. in Opp. 2). This is in accord with basic patent law principles for several reasons.

First, every algorithm implemented by computer programmers is essentially the expression of a fundamental idea embodied in a flow chart, itself translatable without further creative thought into a set of instructions to the computer.[18] See Breyer, *The Uneasy Case For Copyright: A Study Of Copyright in Books, Photocopies, And Computer Programs*, 84 Harv. L. Rev. 281, 341-342 (1970). Thus, respondents' idea for transferring data between the scratchpad registers and the main memory of a digital computer is embodied in the algorithm represented by the flow charts of Figures 15b and 15c of their specification (J.A. 120) and is easily programmable by persons of ordinary skill in the art (J.A. 138, 155, 169).[19] Neither the fun-

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[18] Our discussion here, as throughout this brief, is limited to algorithms in the computer programming context. See note 12, *supra*. We do not, therefore, suggest that a "step-by-step procedure for obtaining a given result" (C. Sippl & C. Sippl, *supra*, at 23) necessarily is unpatentable as an algorithm when no computer program is involved. In other contexts, a description of a patentable process could be similarly characterized. See *Flook*, *supra*, 437 U.S. at 589.

[19] Respondents contend that "[f]igures 15b and 15c are flow diagrams of machine operations" and "do *not* illustrate microprogram steps" (Br. in Opp. App. B 2b). Before the Patent Office, however, respondents claimed that the control memory

damental idea nor the translation of that idea into language that can be comprehended by the computer—the computer program—is patentable. The program itself is no more patentable than any other translation from one language to another; the fundamental idea is no more patentable than new ideas for step-by-step methods of doing business, which have repeatedly been held unpatentable. See *Joseph E. Seagram & Sons* v. *Marzall*, 180 F.2d 26, 28, (C.A.D.C. 1950) (method of testing consumer product preferences); *Hotel Security Checking Co.* v. *Lorraine Co.*, 160 F.2d 467, 469 (2d Cir. 1908) (bookkeeping system); *Berardini* v. *Tocci*, 190 F. 329, 332–333 (S.D.N.Y. 1911), aff'd on the opinion below, 200 F. 1021–1022 (2d Cir. 1912) (system using code messages for banking transactions); *Loew's Drive-In Theatres, Inc.* v. *Park-In Theatres, Inc.*, 174 F.2d 547, 552 (1st Cir. 1949) (idea of self-service cafeteria); *In re Patton*, 127 F.2d 324, 327–328 (C.C.P.A. 1942) (fire protection system); *In re Wait*, 73 F.2d 982 (C.C.P.A. 1934) (method of selling stock).

There is an important difference between patenting a novel process and patenting an algorithm for a computer program. With the novel process the inventor seeks to preclude others from actually carrying out the

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"when microprogrammed in accordance with the microprogram depicted by flow charts of 15b and 15c results in the firmware * * *" (J.A. 141–142). Respondents repeatedly referred to the microprogramming of the control memory by the "microprogram as disclosed by the flow charts of Figures 15b and 15c," noting that "persons of ordinary skill in the art can microprogram them when provided with the flow charts of the microprogram" (*id.* at 138, 155, 169).

procedures of his invention. *Cochrane* v. *Deener*, 94 U.S. 780, 788 (1876). Nothing in the patent law, however, would prevent others from writing down and passing on the description of his process as long as the process itself was not practiced. But with the algorithm for a computer program the inventor seeks to prevent others from even communicating his new idea by translating his algorithm into a program and loading the program into a computer. In other words, he seeks to patent the idea itself, or at least a form of expressing it.[20]

Second, the rationale of *Parker* v. *Flook* is not limited, as the court below suggested, to computer-implemented algorithms designed to solve mathematical problems—*i.e.*, to manipulate data in order to arrive at a solution to a numerical problem (J.A. 17-18). The court's distinction between "mathematical" and "non-mathematical" computer-implemented algorithms is, as the Board observed (J.A. 202), basically illusory: because a digital computer is designed solely to perform mathematical computations, any program that it can implement must necessarily be mathematical.[21] The fact that many programs—like elementary alge-

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[20] Hence, Congress is presently considering a proposal for clarifying the copyright status of computer programs (see page 24, *infra*).

[21] The CCPA recognized this in *In re Sherwood*, 613 F.2d 809, 816-817 (1980), petition for cert. pending, when it stated that: "writing a computer program may be a task requiring the most sublime * * * inventive faculty or it may require only the droning use of a clerical skill. The difference between the two extremes lies in the creation of mathematical methodology [the algorithm] to bridge the gap between the information one starts with ('the input') and the information that is desired ('the out-

bra—are abstractions of physical phenomena that might also be expressed non-mathematically, in words, does not make such programs any less mathematical. Nor are computer programs "non-mathematical" when the result of the computer's completion of the mathematical calculations directed by the program is to supply the computer user with non-numerical information—such as a page of the Milwaukee telephone directory or the text of a court opinion (J.A. 18).[22]

The computer industry has not generally drawn the distinction between "mathematical" and "non-mathematical" computer-implemented algorithms that the CCPA apparently[23] finds significant.[24] Moreover,

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put')." But whatever the level of inventiveness, the creation of "mathematical methodology" is not patentable, as *Flook* and *Benson* indicate.

[22] It is, of course, possible for a process utilizing a computer to be patentable; if, after setting aside the computer-implemented algorithm, what remains is new and useful, a patentable claim is asserted. *Flook*, *supra*, 437 U.S. at 591-592.

[23] It is not clear that the Court of Customs and Patent Appeals finds this difference to be of general significance for it has stated that a claim whose only arguable invention was a mathematical algorithm is nonetheless patentable subject matter. *In re Johnson*, 589 F.2d 1070 (C.C.P.A. 1978). It may be more accurate to conclude, as respondents did in their argument to the Board, that subsequent decisions of the Court of Customs and Patent Appeals have restricted this Court's decision in *Benson* "to its own fact situation" (J.A. 175; cf. J.A. 146, 160).

[24] In *Gottschalk* v. *Benson*, the inventors did not limit their definition of an algorithm to mathematical equations. In their application to the Patent Office, Benson and Tabbot defined "algorithm" to mean "a self-consistent set of ordered steps specifying definable operations and leading to a desired result." Record on Appeal, *In re Benson*, 441 F.2d 682 (C.C.P.A. 1971),

nothing in *Benson* or *Flook* requires or suggests a distinction in the patent law between types of computer-implemented algorithms. Both cases involved "mathematical algorithms" as the CCPA has used that term, but both decisions rested on earlier cases finding lack of patentable subject matter in claims for abstract intellectual concepts or scientific truths—some mathematical in nature, some not. *Gottschalk* v. *Benson*, *supra*, 409 U.S. at 63-64; *Parker* v. *Flook*, *supra*, 437 U.S. at 584-585. See *Funk Brothers Seed Co.* v. *Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948); *Rubber-Tip Pencil Co.* v. *Howard*, 87 U.S. (20 Wall.) 498, 507 (1874); *Wyeth* v. *Stone*, 30 F. Cas. 723 (C.C.D. Mass. 1840) (No. 18,107) (Storey, J.); *O'Reilly* v. *Morse*, *supra*, 56 U.S. (15 How.) at 112-113. See, also, *Graham* v. *John Deere Co.*, 383 U.S. 1, 8 n.2 (1966). Both *Benson* and *Flook* instead turned on the recognition that the essence of computer algorithms—whether they be labeled mathematical or non-mathematical—is that they are mathematical statements of ideas or concepts, and these are not patentable. *Benson*, *supra*, 409 U.S. at 67-68.

Finally, a new computer program is not patentable on the theory that it describes a new use for a known machine. This Court has consistently held that a claim

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at 34. Similarly, in Honeywell's *Benson amicus* brief in this Court, the definition of "algorithm" was not limited to the solution of mathematical problems. That brief stated that an algorithm is a "prescribed set of well-defined rules or processes for the solution of a problem in a finite number of steps, *e.g.*, a full statement of an arithmetic procedure for an evaluation, to a stated degree of precision." Brief of Honeywell, Inc. as Amicus Curiae, *Gottschalk* v. *Benson*, 409 U.S. 63 (1972), at 12 n.18.

describing the inherent operation of a known machine is not statutory subject matter. *Corning* v. *Burden*, 56 U.S. (15 How.) 252, 268 (1853); *Risdon Iron & Locomotive Works* v. *Medart*, 158 U.S. 68, 77, 84 (1895); *Westinghouse* v. *Boyden Power Brake Co.*, 170 U.S. 537, 554–557 (1898); *Expanded Metal Co.* v. *Bradford*, 214 U.S. 366, 383 (1909).[25] But that is exactly what is claimed by respondents and others seeking patents on computer programs—whether the claim is to a process patent or, as here, is to a machine patent. The inventors of the digital computer described in respondents' specification intended that their machine could be programmed in many different ways.[26] Indeed, the capacity of the control store unit to be microprogrammed so as to control various operations of the computer probably contributed to the usefulness of this particular computer hardware arrangement in the first place. And whether the machine is capable of executing respondents' algorithm is obviously predetermined by the design of the machine. Employing a new computer program (whether that program is conventional software or a new mi-

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[25] The same rule has been applied in the lower courts. See, *e.g.*, *Newton Steel Co.* v. *Surface Combustion Co.*, 75 F.2d 305, 308 (6th Cir. 1935); *Vapor Car Heating Co.* v. *Gold Car Heating & Lighting Co.*, 7 F.2d 284, 287–288 (2d Cir. 1925); *In re Wadman*, 94 F.2d 993, 997–998 (C.C.P.A. 1938).

[26] Respondents themselves acknowledged the versatility of the control store unit when they observed that it can be programmed "for a variety of central processing unit CPU 1306 operational modes" (J.A. 60; see, also, Coulter patent No. 3,891,974, *supra*, note 12, at 23) (using identical language to describe the capability of the control store unit). The examiner concurred (J.A. 182).

croprogram of the kind respondents have claimed) thus does not change how the designer of the computer contemplated it would operate. It merely describes one inherently available operation of the already-patented machine.[27] In these circumstances, a patent on a computer program, or—as respondents claim—on the computer machine with the microprogram, would in effect grant a further patent on an old machine. See *Detroit Gasket & Mfg. Co.* v. *Fitzgerald Mfg. Co.*, 89 F.2d 178, 183 (2d Cir. 1937). This would extend the term of the original patent on the machine, despite the public's right of free access when the statutory patent term expires. *Graham* v. *John Deere Co.*, 383 U.S. 1, 6 (1966). Plainly, then, such claims are for the inherent functioning of a known machine and are, accordingly, not patentable subject matter.[28]

In sum, respondents' idea for transferring information from the scratchpad memories to the main memory, as implemented in their novel microprogram, is not within the scope of patentable subject matter as

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[27] It is as if respondents claimed a new machine from the combination of an old player piano and a piano roll inscribed with a song they had created.

[28] Even if an application identifying a novel use for an old machine might be patentable as a process patent (see *In re Zierden*, 411 F.2d 1325, 1328–1331 (C.C.P.A. 1969)), respondents have not discovered such a new use. The idea of switching data from scratchpad registers to main memory by means of a computer program is not respondents'. Respondents themselves have noted that model-dependent software previously had been used for this purpose (J.A. 26–27). In any event, such a discovery would not be patentable as a machine. See, *e.g.*, *Roberts* v. *Ryer*, 91 U.S. 150, 157 (1875); *General Electric Co.* v. *Jewel Incandescent Lamp Co.*, 326 U.S. 242, 247–249 (1945).

defined in Section 101 and must, under *Parker* v. *Flook*, be "treated as though it were a familiar part of the prior art" (437 U.S. at 592). Because everything else in their claims is old in the art, the Board correctly applied *Parker* v. *Flook* in concluding that the claims do not recite statutory subject matter.

B. ALGORITHMS CODED IN FIRMWARE ARE NOT PATENTABLE.

The present case differs from *Benson* and *Flook* in that it does not involve a software computer program and traditional process claims. Rather, respondents have embodied their program in firmware and assert that they wish to patent a machine. These distinctions, however, do not entitle respondents to a patent.

The fact that the program is in firmware rather than traditional software is of no legal significance. As the Court of Customs and Patent Appeals itself noted, firmware "may be likened to software" (J.A. 19). And see *In re Maucorps*, 609 F.2d 481 (C.C.P.A. 1979). The only difference between the two is that with software the program is loaded into a different type of memory storage from the type of storage—a control unit—used in firmware (compare J.A. 7-8 with J.A. 9). A program directing a series of sequential steps is the essence of both. The algorithm is no less abstract when claimed as a part of firmware.[29] The control unit,

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[29] In the instant case it effectuates no physical transformation of material, defines no procedure the computer machine was not already capable of performing, contemplates no post-solution activity, and has no practical application except in connection with a digital computer. See *Gottschalk* v. *Benson*, *supra*, 409 U.S.

like a blank page of a book, is capable of being imprinted with a variety of instructions (see note 7 and page 17, *supra*).[30] It contains the algorithm's directions to the components of the computer just as the page of a cookbook could be printed with directions to a cook for using specialized kitchen equipment to simplify traditional recipes. Like the directions in the cookbook, however, the microprogram in the control unit cannot be patented no matter how original the algorithm upon which it is based. See *In re Russell*, 48

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at 71–72. Moreover, the algorithm is not limited to the particular digital computer described in respondents' specification. It may be used in other computers as well (see page 5, *supra*). Although respondents now claim (Br. in Opp. 19, n. 34) that "[t]he invention [*i.e.* the firmware] is marketed as an integral part of a new computer machine," they emphasized before the Board that their invention included "a *model-independent* instruction means which is implemented in firmware" (J.A. 165; emphasis added; see also J.A. 27). In sum, what respondents seek to protect is simply their idea for transferring data from one place to another inside a known computer.

[30] Before this Court, however, respondents argue that the PROM described in their specification requires "physical alterations by the manufacturer of the computer to create the desired circuits" (Br. in Opp. App. B 1b). They offer no citation to the record in support of this proposition. On the contrary, the language of the specification (J.A. 60, quoted at note 7, *supra*) as well as respondents' description in their specification of a "control store interface adapter C1A 1302", a "control and load unit CLU 1304", and a "control store loader CSL 1303" from which "the control store unit CSU 1301 receives microinstructions" (J.A. 60; see Fig. 13a, J.A. 112) strongly suggest that the control unit can be programmed electrically by the person using the computer in the field. The record does not clearly indicate which type of PROM is involved here, although the capacity of respondents' PROM to be "reloaded" (J.A. 60) suggests that it is of the reprogrammable type. See R. Kline, *supra*, note 6, at 333. For instance, see U.S. Patent No. 3,944,984 to Morley, *et al.*, patented March 16, 1976, filed April 23, 1974.

F.2d 668, 669 (C.C.P.A. 1931) (printed directory not patentable); *In re Kothny*, 96 F.2d 289, 291 (C.C.P.A. 1938) (novel measuring scale on transparent paper not patentable); *Murphey* v. *American Ry. Express Co.*, 24 F.2d 318, 320 (8th Cir. 1928) (novel means for waybilling an express shipment using a unique label not patentable); *Wier* v. *Coe*, 33 F. Supp. 142, 143–144 (D.D.C. 1940), aff'd per curiam, 122 F.2d 959 (D.C. Cir. 1941) ("musically staffed sheets" and novel method of separately identifying musical themes and their recurrence not patentable).

Nor does respondents' microprogram somehow transform the old hardware into a new machine (cf. Br. in Opp. 19). The fact that the unpatentable algorithm in the microprogram was recorded in the control unit no more operates to make it statutory subject matter than would the recording of an unpatentable process on a blank tape make the recorded process patentable. See *In re Walter*, 205 U.S.P.Q. 397, 409 (C.C.P.A. 1980). Still less does the recording of the microprogram in the control unit turn the combination of the programmed unit and the conventional elements of the computer into a new machine. The only machine involved here is the familiar general purpose digital computer, unchanged by respondents in any of its hardware components or their arrangement. To hold the microprogrammed computer patentable as a new machine would be to make patentability turn on the skill of the draftsman. But *Parker* v. *Flook* teaches that the congressional directive in Section 101 of the Patent Law requires that every patent grant contain a patentable invention. While claimants can draft their

claims as they like, the Patent Office must determine what, if anything, the claimants actually invented. For the purposes of this inquiry, substance must govern form. See *Parker* v. *Flook*, *supra*, 437 U.S. at 590, 594. The Patent Office correctly found that the only thing that respondents invented was a computer algorithm. That, however, is not statutory subject matter. As Judge Rich has elsewhere noted, "the legal doctrine that a new program makes an old general purpose digital computer into a new and different machine * * * partakes of the nature of a legal fiction when it comes to drafting claims." *In re Johnston*, 502 F.2d 765, 773 (C.C.P.A. 1974) (Rich, J. dissenting). That "fiction" should not be permitted to prevail over the requirement for patentable subject matter in Section 101. See Report of the President's Commission on the Patent System 13 (1966), as quoted in *Gottschalk* v. *Benson*, *supra*, 409 U.S. at 72.[31]

II. IT IS FOR CONGRESS TO DETERMINE WHETHER, AND THE EXTENT TO WHICH, COMPUTER PROGRAMS OUGHT TO BE PROTECTED

This Court has twice stressed that if the patent laws are to be extended to cover computer programs this must be done by Congress, not the courts. Noting that the President's Commission on the Patent System rejected a proposal that computer programs be made

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[31] Similarly, it is immaterial that respondents have chosen to claim a patent on a machine rather than a process, and phrase their claims in machine rather than process terms. The principles of *Parker* v. *Flook* are as applicable to machine claims as to process claims. *In re Freeman*, 573 F.2d 1237, 1247 (C.C.P.A. 1978); *In re Maucorps*, *supra*, 609 F.2d at 485; *In re Walter*, 205 U.S.P.Q. 397, 407–408 (C.C.P.A. 1980). Cf. *Benson*, *supra*, 409 U.S. at 67–68.

patentable, the Court in *Gottschalk* v. *Benson*, *supra*, 409 U.S. at 72–73, concluded that "considerable problems are raised which only committees of Congress can manage * * *."[32] And in *Parker* v. *Flook*, *supra*, 437 U.S. at 595, the Court emphasized the "[d]ifficult questions of policy" Congress could answer "on the basis of current empirical data not equally available to this tribunal." These policy questions include the decision whether the public interest would be served by opening the patent system to an industry that has grown remarkably without such protection, and the relationship of any federal law to foreign laws that do not permit the patenting of computer programs. In addition, Congress is the proper body to address in the first instance the difficulties that would have to be overcome in order to develop an effective system for the examination of computer programs and the determination of when a particular algorithm infringes a protected one.[33]

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[32] See "To Promote the Progress of . . . Useful Arts," Report of the President's Commission on the Patent System 13 (1966) (reprinted in Subcomm. on Patents, Trademarks, and Copyrights, Senate Comm. on the Judiciary, Doc. No. 5, 90th Cong., 1st Sess. 21 (1967). The ABA Patent, Trademark and Copyright Law Section agreed that there should be "a legislative resolution of many of the uncertainties in the law relating to proprietary rights relating to computer programs, rather than a case by case resolution in the courts." ABA Patent, Trademark and Copyright Law Section, *1972 Committee Reports* 251 (1973) and *1972 Summary of Proceeding* 150 (1973).

[33] These policy questions and problems are discussed in the President's Commission Report, *supra*, note 22, and in briefs amicus curiae filed by the Computer and Business Equipment Manufacturers Ass'n in *Parker* v. *Flook*, *supra* (No. 77-642, 1977 Term, at 17–21, 25–26) and by Honeywell, Inc. in *Gottschalk* v. *Benson*, *supra* (No. 71-485, 1972 Term, at 17–18).

These issues are further complicated by recent developments pertaining to the copyrighting of computer programs.[34] The National Commission on New Technological Uses of Copyrighted Works has recommended amendment of the copyright law to make explicit that computer programs are the proper subject matter of a copyright and that the copyright laws apply to all computer uses of copyrighted programs.[35] On March 26, 1980, Representative Kastenmeier introduced a bill entitled The Computer Software Copyright Act of 1980. 126 Cong. Rec. H2263 (daily ed.). Enactment of that bill would resolve some of the problems addressed in the National Commission report. This current legislative activity demonstrates the wisdom of this Court's determination in *Benson* and *Flook* to leave to Congress the determination of the appropriate method and level of protection, if any, for computer programs.

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[34]The present copyright statute provides that "[c]opyright protection subsists * * * in original works of authorship fixed in any tangible medium of expression * * * from which they can be perceived, reproduced or otherwise communicated, either directly or with the aid of a machine or device." 17 U.S.C. (Supp. II) 102. The Copyright Office has been registering computer programs since 1964 (see Copyright Office Circular 311 (January 1965)) but their copyright status remains in doubt. See Pope and Pope, *Protection of Proprietary Interests In Computer Software*, 30 Ala. L. Rev. 527, 546 (1979).

[35]See Final Report of the National Commission on New Technological Uses of Copyrighted Works 1-2 (1979).

CONCLUSION

For the foregoing reasons, the judgment of the Court of Customs and Patent Appeals should be reversed.

Respectfully submitted.

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